The Impact of Business Services on the Economic Well-being of Small Farmers in Nicaragua

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Overview of the MCC Rural Business Program in Nicaragua

- A key part of the Nicaragua-MCC compact, the Rural Business Program was designed to group 20-30 geographically proximate farmers together into *nucleos*, enhancing their business knowledge and access to markets and improved technologies
- Program also included elements of matching investment (e.g., in improved milking sheds) and costs about $US2500 per-farmer in the program
- Participants are subject to self-selection and administrative filters (elgibility criteria & business plan approval)
- Program goal is to increase productivity and family economic well-being (we will test the latter using per-capita expenditures)
- Also note that a program of this sort could, through a variety of mechanisms, crowd-in additional investment and create an impact time path (a point we will return to later under the rubric of asymptotic treatment effects)

Eligibility Rules & Targeting

	SESAME	BEAN	VEGETABLES	CASSAVA	LIVESTOCK
1	Farmer had to plant in the past at least:				Farmer owns between 10 and 100 cows of milk producing age.
	1.4 hectares with sesame	0.7 hectares with bean	any size with vegetables	1.4 hectares with cassava	
2	Minimum area of the farm with soil suitable for agricultural crops:				Livestock activity is developed on the farm. No minimum farm size.
	7 Hectares	3.5 hectares	1.4 hectares	3.5 hectares	
3	If there is an irrigation system, minimum area of the farm with soil suitable for agricultural crops is 437.8 square meters				Water access is located inside the farm.
4	Maximum area of the farm with soil suitable for agricultural crops:				There are permanent available roads to access the farm in any season of the year.
	35.2 hectares	35.2 hectares	14.1 hectares	70.4 hectares	
5	Farmer is in possession or has a title of the farm				
6	Farmer is a least 20 years old				
7	Farm is located out of the "national protected areas"				

# Eligibility Rules & Targeting
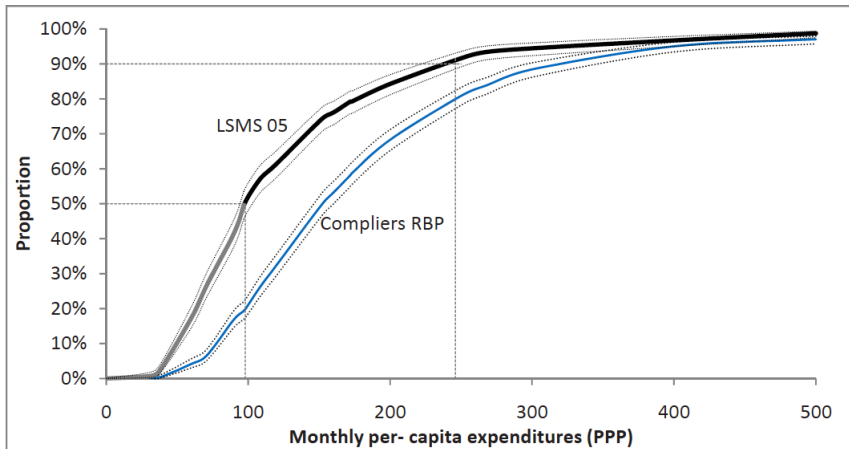
Evaluating Program *Effectiveness*

- Goal was to identify program effectiveness, not its abstract efficacy
- Doing so, means working with the program as it is actually implemented (and scalable)
- In mid-2007, worked with MCA-Nicaragua to identify a set of 142 nucleos, divided appropriately between the different product lines
- Blocking by product lines, these *nucleos* were then split randomly between early treatment groups & late treatment groups (or controls)
- This procedures left MCA free to begin work in their other ~500 nucleos at any time
- For the baseline survey, the survey team created a census of all eligible producers in each of the 142 study nucleos
- A random samples of 1600 of these eligible producers became the base of this study

Figure 2. Timeline of early and late participants joining the project as compared to timing of survey rounds
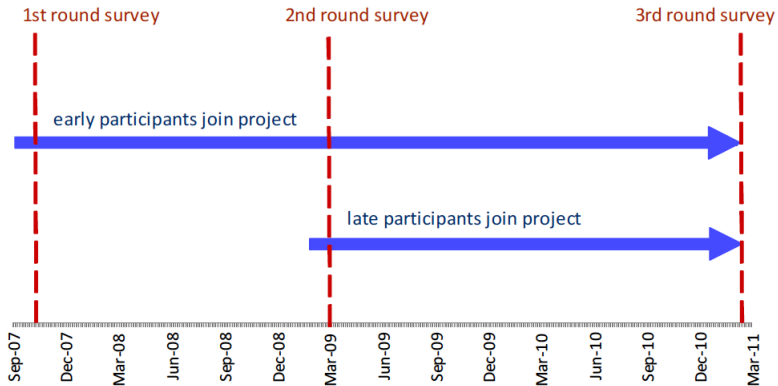
Program Evolution & Protocol 'Violations'
Or, why evaluating effectiveness is hard!

- The Rural Business Program was of course not static
- Over time, new activities added (e.g., rice which is the subject of a separate evaluation) and modalities of implementing the program changed
- Bean program shifted to a group-based business plan (note that bean farmers are the smallest and least well-off of the target producer group
- While it would be unethical to oppose program improvement for the sake of evaluation, such changes of course bring challenges for evaluation
- In particular, we are currently trying to understand changes in treatment status in:
  - Self-selecting individuals who became ineligible when the group business plan model was adopted
  - Implementer that jumped into a reserved late treatment area when shifted to group plan
- We are in process of reanalyzing the data: some worrisome signs of instability of results, but for now will use old results (with some misclassifications)
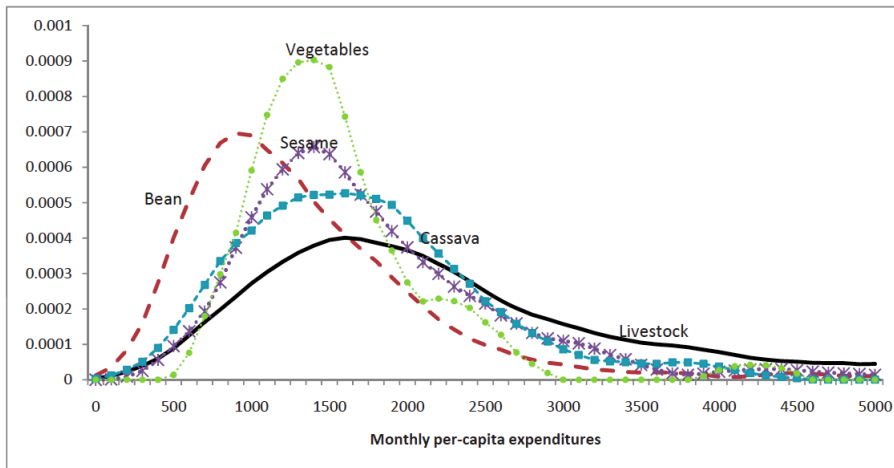
Baseline Data & Randomized Assignment
Distribution of Baseline Expenditures by Treatment Status
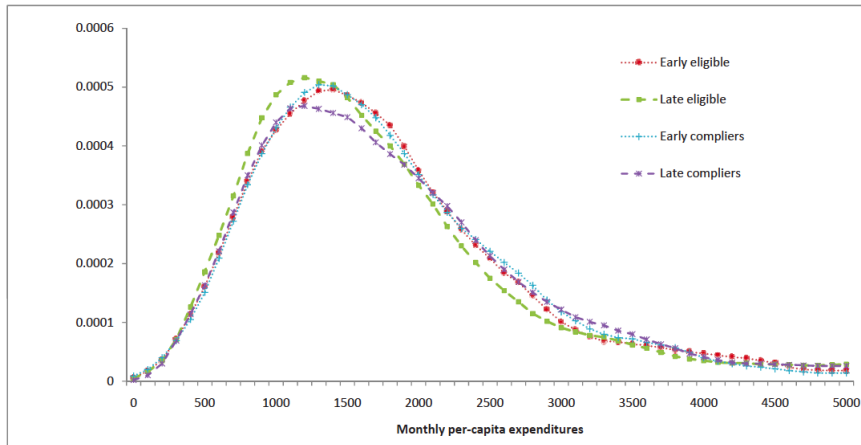
Baseline Data & Randomized Assignment
Heterogeneity by Crop (& need for balance)

Baseline Data & Randomized Assignment
Credit Rationing & Other Indicators

	All eligible farmers		All compliers Farmers	
	Early	Late	Early	Late
Expenditures (average per-capita in Cordobas)	2048	2033	2029	2085
	(0.057)^KS		(0.037)^KS	
Mobile farm assets (average,'000 of Cordobas)	46.6	42.6	50.0	46.1
	(0.041)^KS		(0.073)^KS	
Farm's installations (average,'000 of Cordobas)	23.3	22.6	26.4	23.9
	(0.032)^KS		(0.086)^KS	
Animals (average,'000 of Cordobas)	122.9	142.2	138.5	172.2
	(0.040)^KS		(0.078)* ^KS	
Land size (average in *manzanas*)	37.0	41.1	41.1	46.1
	(0.041)^KS		(0.078)*^KS	
Formal tenure (average % of farm)	42	45	41***	51***
	(0.041)^KS		(0.127)***^KS	
Credit status				
With a loan	42	41	45	44
No credit-price rationed	16	20	16	19
Quantity rationing	16	12	15	11
Risk rationing	26	28	24	26
	(11.25)**^MP		(4.827)^MP	
Farmer's age (average of years)	50	52	50***	53***
	(0.064)*^KS		(0.100)***^KS	
Farmer's education (average of years)	4.3	4.9	4.5	4.4
	(0.030)^KS		(0.076)^KS	
Farmer's gender (% male)	86%	86%	86%	88%
	(0.04)^TP		(0.76)^TP	
Number of household members (mode)	5	4	5	4
	(12.47)^MP		(13.31)^MP	

Table 2. Round two (2009) survey findings

Mean per-capita monthly expenditures (2005 PPP US$)

	Late treatment (those without business services until 2009)	Early treatment (those with business services starting 2007)
All eligible HHs	$221	$219
Participating HHs	$212	$225

Difference-in-difference estimates (2005 PPP US$)

|	Total monthly expenditures	Per-capita monthly expenditures
All eligible HHs	$4 (0%)	$ -6 (-3%)
Participating HHs	$28 (3%)	$4 (2%)

Impact Heterogeneity: Quantile Treatment Effects
Tainted Results

Conditional Quantiles	Estimated Impacts on Per-capita Monthly Expenditures in $USPPP
10	-1.18
20	-2.15
30	1.43
40	2.74
50	7.71
60	*10.22*
70	*12.21*
80	*13.34*
90	*17.7*
968 observations (Complier Types only); Regression controls for Farmer Age, Experience, Crop Type & Treatment Status	

# Targeting Revisited
Reaching further Down the Wealth Spectrum?
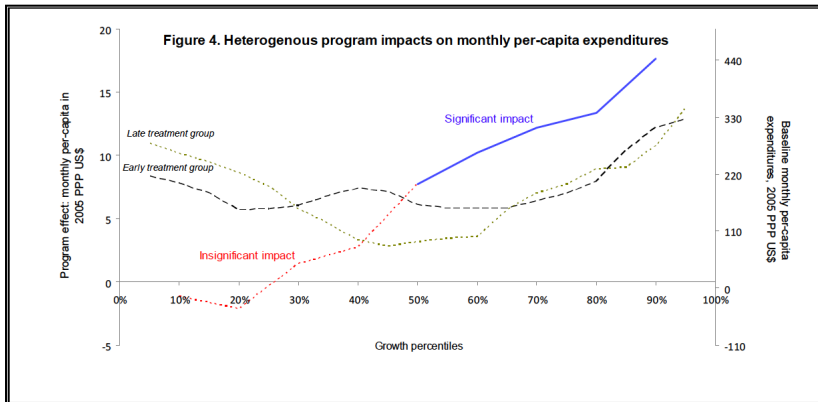
Figure 4. Heterogenous program impacts on monthly per-capita expenditures

- Theory suggests a number of reasons why we might expect impact to grow as exposure to business service increases:
  1. Relaxation of liquidity constraints with expanded earnings
  2. Learning effects and growing economic efficiency
  3. Both imply that this kind of program may crowd-in investment and further impacts

- It is this long-run or asymptotic effect that is the Policy-Relevant Treatment Effect

- Let's look at an example from an agricultural asset transfer program in South Africa

Asymptotic Treatment Effects
Asset Transfers in South Africa
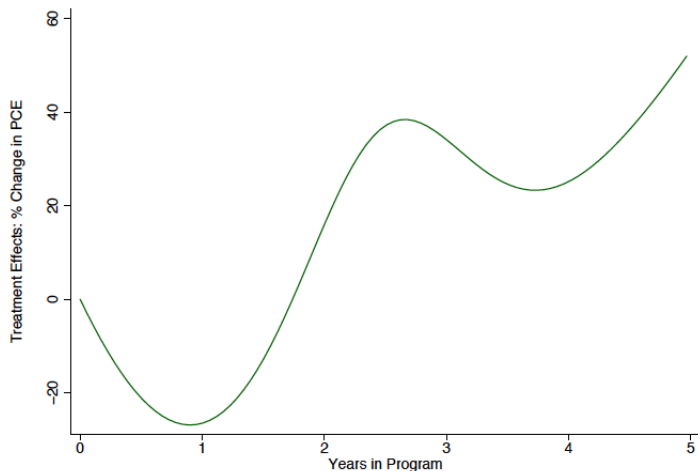
Conclusion

- Estimated impacts to date (short-term, binary treatment effects) are modest
- Nonetheless, for the upper quantiles, treatment effects imply internal rates of return of up to 14% (not bad, but short of goal)
- Endline survey will be in the field next month, and we will have the data to estimate the impact response function and the asymptotic treatment effect
- Heterogeneity across quantiles remains a puzzle, and one which we are investigating
- Importantly (especially for Feed the Future), we need to think about incentives for seeing how far down the wealth spectrum small farmer programs can work